REMARKS

Claims 1-14 are all the claims pending in the application.

I. Response to Objections to the Specification

The specification is amended herein in response to the Examiner's objection to the specification. In addition, the noted grammatical/typographical errors are corrected. Support for the amendments to the specification is found on page 54, lines 16-19 and general formulas 3 and 4 in the specification and the original claims. Hence no issues of new matter are presented.

II. Response to Objections to the Claims

The claims have been amended herein to correct the noted improper multiple dependencies. Accordingly, Applicants respectfully request withdrawal of the objection.

III. Response to Claim Rejections Under 35 U.S.C. § 112, 1st Paragraph

Claims 1-7 are rejected as allegedly non enabled for the full scope of the claimed invention based upon the recited repeating units.

Applicants respectfully traverse the rejection and provide the following based upon Table 1 of Example 1 of the present specification.

Table 1 on page 66 of the present specification provides data regarding the fluorescence peak, excitation wavelength and absorption edge wavelength of Example 1, a polymeric fluorescent substance of the present invention. Since an absorption spectrum of a polymeric fluorescent substance approximately coincides with the absorption of each repeating unit which constitutes the polymeric fluorescent substance, the character of the main repeating unit tends to appear strongly. Therefore, the absorption edge wavelength of polymeric fluorescent substance

1 shows near the absorption edge wavelength value of polymeric fluorescent substance 2 which consists of only a repeating unit of formula (1).

On the other hand, among the repeating units constituting the polymeric fluorescence substance, a fluorescence spectrum tends to show the character of the repeating unit having the smallest energy gap strongly. Therefore, the fluorescence peak wavelength of polymeric fluorescent substance 1 shows near the value of polymeric fluorescent substance 3 which consists of only a repeating unit of formula (3). Furthermore, with respect to a polymeric fluorescent substance (homopolymer) consisting of only a single repeating unit, the absorption edge wavelength and the fluorescence peak wavelength usually show similar values (*cf.* polymeric fluorescent substances 2 and 3).

Therefore the absorption edge wavelength of each homopolymer consisting of only one of the two repeating units contained in polymeric fluorescent substance 1, can be easily estimated only from the character of polymeric fluorescent substance 1, even though the homopolymers are not actually prepared.

Thus, a person of ordinary skill in the art in sufficiently enabled to make and use the invention commensurate in scope with the claims based upon the present disclosure.

IV. Response to Claim Rejections Under 35 U.S.C. § 112, 2nd Paragraph

Claims 1-7 are rejected under 35 U.S.C. § 112, 2nd paragraph as allegedly indefinite. The Examiner states that the phrase "contains each one or more of repeating units" and the term "respectively" is confusing. Additionally, the Examiner states that in independent claim 2 "repeating units represented by formulae (1), (3) and (4)" is recited but only formula (4) is set forth in the claim.

Applicants have amended claims 1 and 2 herein, thereby obviating the rejection. Accordingly, Applicants respectfully request withdrawal of the rejection.

V. Miscellaneous

In paragraph 6 of the Office Action, the Examiner discusses prior art which is considered pertinent to Applicants' disclosure but which is not relied upon as a basis for an art rejection.

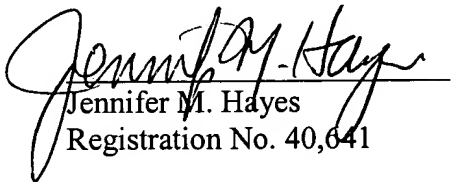
Applicants respectfully submit that the polymers disclosed in the references cited by the Examiner are alternating copolymers and do not meet condition (b) of claim 1 or condition (f) of claim 2. Specifically, the ratio of repeating units largely affects the fluorescent character of the polymeric fluorescent substance. In the present invention, as the repeating units having a smaller energy gap (corresponding to long wavelength of light emission) are contained in a small amount, higher light emitting efficiency can be expected.

VI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

On page 16, paragraph 1:

Ar_1 is a group formed by connecting 2 to 5 arylene groups or heterocyclic compound groups represented by the formula (2). These groups are characterized by the position and bonding direction of a substituent on an arylene group or heterocyclic compound group at the both ends thereof, and Ar_2 and Ar_4 constitute a structure wherein if Ar_2 moves in parallel, it does not overlap ~~At_4~~Ar_4. Namely, both end groups have mutually different skeleton rings, alternatively, if they have the same ring, different substituents are carried, or, even if the same substituent is carried on the same ring, the bonding number and position thereof are different and when the single bond of the main chain rotate, they do not show the same structure and direction. That is, they are different from those which are formed by connecting 2 to 5 of one kind of arylene group or heterocyclic compound group.

On page 17, paragraph 2, bridging pages 17-18:

Ar_1 may ~~be~~ advantageously be selected so as not to deteriorate the fluorescent property of a polymer fluorescent body, and specific examples thereof include those satisfying conditions such as the relation of Ar_2 and Ar_4 in the above-described formula (2) and the like, among groups shown in the following chemical formulae 6 and 7 and those satisfying the relation of X_1 and X_9, X_2 and X_{10}, X_3 and X_{11}, and X_4 and X_{12} and the relation of X_1 and X_{12}, X_2 and X_{11}, X_3 and X_{10}, and X_4 and X_9 in the above-described formula (5), and among groups shown in the following

chemical formula 7. Wherein, when R_9 in the chemical formula ~~11~~ 7 corresponds to R_7 in the above-described formula (5), at least one is a group other than a hydrogen atom.

On page 22, paragraph 2:

~~Ar_2~~ Ar_5 in the above-described formula (3) and ~~Ar_3~~ Ar_6 in the above-described formula (4) are an arylene group having 6 to 60 carbon atoms contained in the main chain, or a divalent heterocyclic compound group having 4 to 60 carbon atoms contained in the main chain.

On page 22, paragraph 3:

When ~~Ar_2 or Ar_3~~Ar_5 or Ar_6 has a plurality of substituents, they may be the same or different. For enhancing the solubility into a solvent, it is preferable that at least one substituent other than a hydrogen atom is carried, and it is preferable that the symmetric property of the form of a repeating unit including a substituent is low.

On page 22, paragraph 4, bridging pages 22- 23:

~~Ar_2 or Ar_3~~Ar_5 or Ar_6 may be advantageously ~~be~~ selected so as not to deteriorate the fluorescent property of a polymeric fluorescent substance, and specific examples thereof include those divalent groups exemplified in the following chemical formulae 9, 10, 11 and 12.

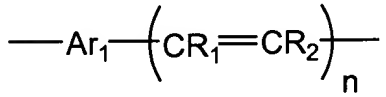
On page 51, paragraph 3, bridging pages 51-52:

~~The~~ A polymer binder to be mixed is preferably used ~~that~~ which does not extremely disturb a charge transport ~~extremely~~ property, and ~~that~~ which does not have strong absorption of the visible light ~~is suitably used~~. As such polymer ~~binder~~binders, polycarbonate, polyacrylate, poly(methyl acrylate) poly(methyl methacrylate), polystyrene, poly(vinyl chloride), polysiloxane and the like are exemplified.

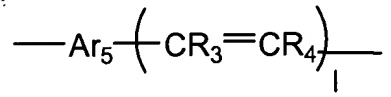
IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) A polymeric fluorescent substance which emits a fluorescence in solid state and having a number-average molecular weight of 10^3 to 10^8 in terms of polystyrene, wherein the substance contains ~~each~~ one or more of repeating units represented by the following formula (1) and formula (3), ~~respectively,~~



. . . . . (1)



. . . . . (3)

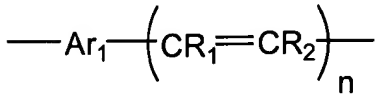
and these repeating units are so selected as to satisfy the following conditions (a) to (c):

(a): the total amount of the repeating units represented by the formulae (1) and (3) is 50 mol% or more of the amount of the whole repeating units,

(b): the amount of the repeating unit represented by the formula (3) is more than 0.1 mol% and less than 9 mol% based on the total amount of the repeating units represented by the formula (1) and formula (3), and

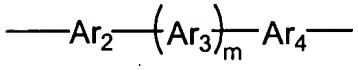
(c): when the absorption edge wavelength of a polymer solely composed of a repeating unit represented by the formula (1) is represented by λ_1 (nm) and the absorption edge wavelength of a polymer solely composed of a repeating unit represented by the formula (3) is represented by λ_2 (nm), the following relation is satisfied:

$$1239/\lambda_1 \geqq 1239/\lambda_2+0.05$$



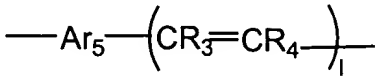
..... (1)

in the formula, Ar_1 is a group represented by the following formula (2); R_1 and R_2 each independently represents a group selected from the group consisting of a hydrogen atom, alkyl group having 1 to 20 carbon atoms, aryl group having 6 to 60 carbon atoms, heterocyclic compound group having 4 to 60 carbon atoms and cyano group; and n is 0 or 1,



..... (2)

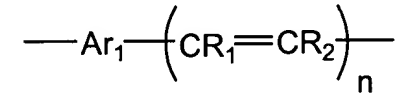
in the formula, Ar_2 to Ar_4 each independently represents an arylene group having 6 to 60 carbon atoms contained in the main chain, or a heterocyclic compound group having 4 to 60 carbon atoms contained in the main chain; at least one of Ar_2 to Ar_4 is a group other than a 6-membered ring, or at least one of Ar_2 to Ar_4 has a substituent other than a hydrogen atom; when a plurality of substituents are carried, they may be the same or different; adjacent rings may be mutually connected directly or via a substituent to form a ring; m is an integer from 0 to 3; wherein, Ar_2 and Ar_4 constitute a structure wherein if Ar_2 moves in parallel to the polymer main chain, it does not completely overlap Ar_4,



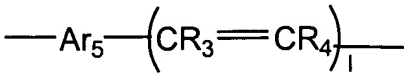
.... (3)

in the formula, Ar_5 represents an arylene group having 6 to 60 carbon atoms contained in the main chain, or a heterocyclic compound group having 4 to 60 carbon atoms contained in the main chain; R_3 and R_4 each independently represents a group selected from the group consisting of a hydrogen atom, alkyl group having 1 to 20 carbon atoms, aryl group having 6 to 60 carbon atoms, heterocyclic compound group having 4 to 60 carbon atoms and cyano group; l is 0 or 1.

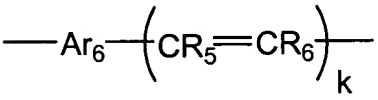
2. (Amended) A polymeric fluorescent substance which emits a fluorescence in solid state and having a number-average molecular weight of 10^3 to 10^8 in terms of polystyrene, wherein the substance contains each one or more of repeating units represented by the following formula (1), formula (3) and formula (4), respectively,



. . . . . (1)



. . . . (3)



. . . . . (4)

and these repeating units are so selected as to satisfy the following conditions (d) to (f):

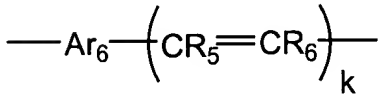
(d): the amount of the repeating unit represented by the formula (1) is 10 mol% or more of the amount of the whole repeating units, and the total amount of the repeating units represented by the formula (1), formula (3) and formula (4) is 50 mol% or more of the amount of the whole repeating units,

(e): the amount of the repeating unit represented by the formula (3) is more than 0.1 mol% and less than 9 mol% based on the total amount of the repeating units represented by the formula (1), formula (3) and formula (4), and

(f): when the absorption edge wavelength of a polymer solely composed of a repeating unit represented by the formula (1) is represented by λ_1 (nm), the absorption edge wavelength of a polymer solely composed of a repeating unit represented by the formula (3) is represented by λ_2 (nm) and the absorption edge wavelength of a polymer solely composed of a repeating unit represented by the formula (4) is represented by λ_3 (nm), the following relations are satisfied:

$$1239/\lambda_1 \geqq 1239/\lambda_2+0.05$$

$$1239/\lambda_3 \geqq 1239/\lambda_2+0.05$$



..... (4)

in the formula, Ar_6 is an arylene group having 6 to 60 carbon atoms contained in the main chain, or a heterocyclic compound group having 4 to 60 carbon atoms contained in the main chain; R_5 and R_6 each independently represents a group selected from the group consisting of a hydrogen atom, alkyl group having 1 to 20 carbon atoms, aryl group having 6 to 60 carbon atoms, heterocyclic compound group having 4 to 60 carbon atoms and cyano group; and k is 0 or 1.

8. (Amended) The polymer light emitting device according to ~~any of Claims 5 to 7~~claim 5, wherein a layer comprising an electron transporting compound is disposed between the cathode and the light emitting layer so that the layer comprising an electron transporting compound is adjacent to said light emitting layer.

9. (Amended) The polymer light emitting device according to ~~any of Claims 5 to 7~~claim 5, wherein a layer comprising a hole transporting compound is disposed between the anode and the light emitting layer so that the layer comprising a hole transporting compound is adjacent to said light emitting layer.

10. (Amended) The polymer light emitting device according to ~~any of Claims 5 to 7~~claim 5, wherein a layer comprising an electron transporting compound is disposed between the cathode and the light emitting layer so that the layer comprising an electron transporting compound is adjacent to said light emitting layer, and a layer comprising a hole transporting compound is disposed between the anode and the light emitting layer so that the layer comprising a hole transporting compound is adjacent to said light emitting layer.

11. (Amended) A flat light source obtained by using the polymer light emitting device of ~~any of Claims 5 to 10~~claim 5.

12. (Amended) A segment display obtained by using the polymer light emitting device of ~~any of Claims 5 to 10~~claim 5.

13. (Amended) A dot matrix display obtained by using the polymer light emitting device of ~~any of Claims 5 to 10~~claim 5.

14. A liquid crystal display obtained by using the polymer light emitting device of ~~any of Claims 5 to 10~~claim 5 as a back-light.